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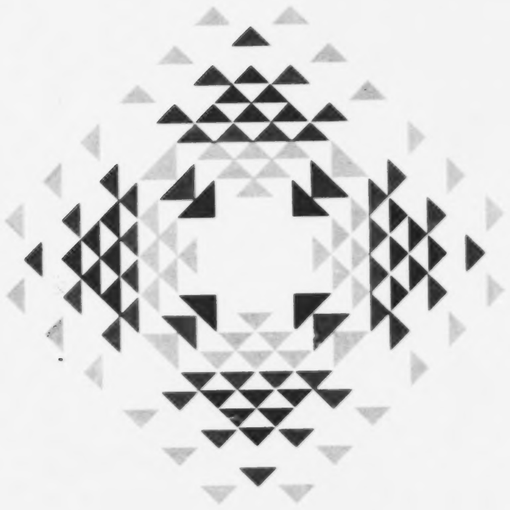
National Institute of Standards and Technology

U.S. Department of Commerce



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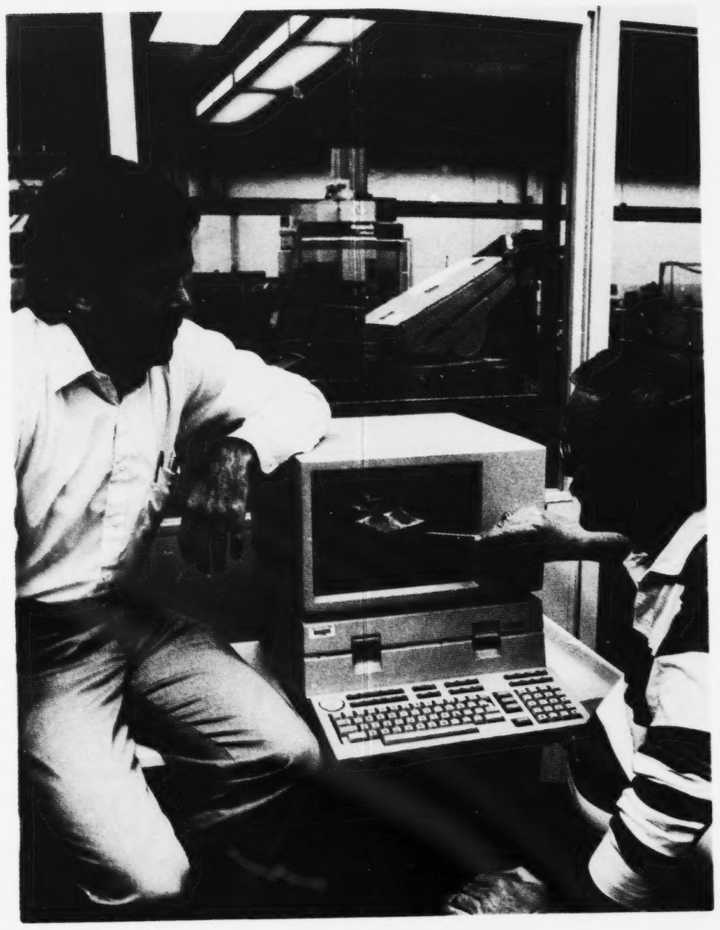
National Institute of Standards and Technology



A good idea often isn't good enough anymore. As U.S. firms have discovered in international markets, innovation by itself does not ensure commercial success. Unless a new technology is quickly translated into an efficiently manufactured, high-quality product, a faster-acting competitor is likely to capitalize on the advance and reap most of the market returns.

The National Institute of Standards and Technology (NIST), a nonregulatory agency in the Department of Commerce, is uniquely positioned to help U.S. firms bolster their competitive performance. Known for most of its nine decades as the National Bureau of Standards, NIST is a world-class center for science and engineering research. It earned this reputation while serving, as the Council on Competitiveness has pointed out, as the "primary federal laboratory with an explicit mission to aid U.S. industry."

Operated on an annual budget of about $285 million, NIST has been a valuable behind-the-scenes partner of industry and academia, providing the standards and measurement techniques that foster technological advance, domestic and international commerce, and, ultimately, economic progress. With the enactment of the Omnibus Trade and Competitiveness Act in 1988, however, the Institute not only underwent a name change, but was designated the federal government's catalyst for speeding innovation and accelerating the adoption of new technologies and new ideas by U.S. companies. That's why about half of the organization's scientists and engineers focus their work on the fastest-moving and, perhaps, most commercially attractive areas of science: advanced materials, electronics, superconductivity, automation, computing, biotechnology, and thin-layer technology.

As for cooperation with industry, that has always been at the core of NIST's business. The 1988 law opens more avenues for its highly skilled staff of some 3,000 to work with industry, universities, federal laboratories, state and local governments—any organization that has an active stake in helping U.S. business compete more effectively. New outreach programs and services have been developed, aimed at helping U.S. industry adopt and exploit the best that technology has to offer.

To aid firms in building a competitive advantage, NIST makes available for cooperative and proprietary work its varied research and testing facilities at its headquarters in Gaithersburg, Md., and its site in Boulder, Colo. A 20-megawatt research reactor, a synchrotron ultraviolet radiation facility, an automated manufacturing research facility, a metals processing laboratory, and a computer network and security facility are but a few of the facilities available.

The goal of this expanded mission is embodied in the criteria used to select the winners of the annual Malcolm Baldrige National Quality Awards, which NIST manages. Winning firms achieve continuous improvement in their manufacturing processes and final products. They, like formidable foreign competitors, have succeeded in meshing efficiency, flexibility, quality, and innovation in a single operation.

By developing the precision measurements critical to achieving these attributes and by helping firms adopt the tools and approaches necessary for continuous improvement, NIST intends to help ensure that U.S. firms will be equipped to meet the demands of global competition.

For general information on Institute programs, write or call the contacts given inside or the Inquiries Unit, E128 Administration Bldg., 301/975-3058.

*All addresses are at the National Institute of Standards and Technology, Gaithersburg, MD 20899.

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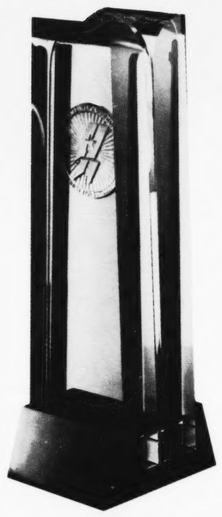
Materials Science and Engineering Laboratory

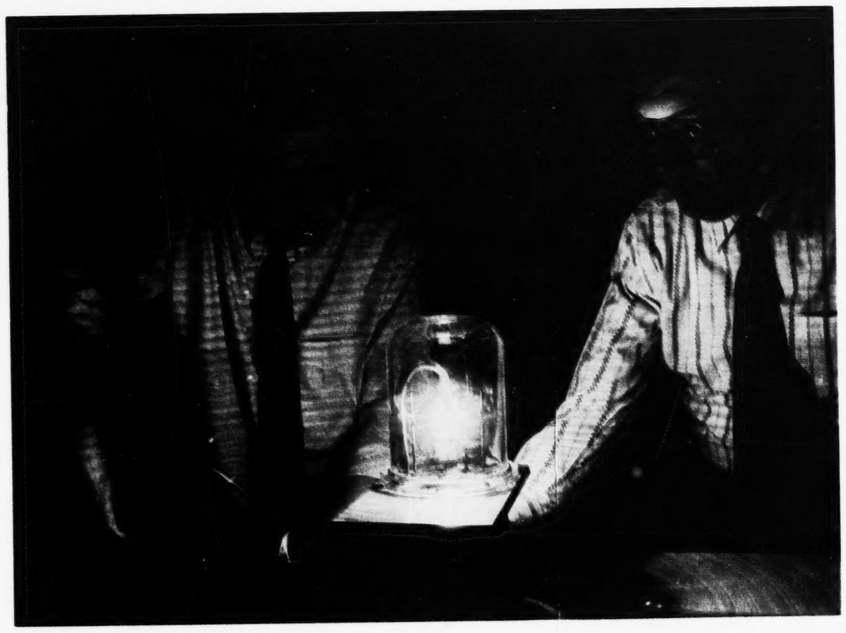
Without new and better materials, technological progress would come to a halt. Increasingly, advances in fields ranging from electronics to construction depend on the mastery of an almost infinitesimally small domain, the arrangements of atoms and molecules that determine material properties. MSEL's research staff investigate all classes of advanced materials: ceramics, polymers, composites, and metallic alloys. The results are data, measurement tools, and services for understanding, improving, predicting, and controlling the processing and performance of materials.

MSEL projects include:

- A high-tech ceramics program to help U.S. industry stay competitive in the worldwide race to expand production and application of ceramics.
- Exploration and quantification of processing technologies for producing new and improved alloys.
- Construction of a cold neutron facility at its 20-megawatt research reactor for the study of advanced materials.
- Collaborations to develop and exploit technologies for improving quality and reducing the cost of domestic steel, aluminum, and other metals.

Information: B309 Materials Bldg., 301/975-5658.





National Measurement Laboratory

NML's researchers subscribe to an irrefutable maxim: If a process cannot be measured or a product characterized then it is not completely understood. Their work takes them to the frontiers of the physical and chemical sciences, the birthplace of many new technologies. And it takes them to the manufacturing floor, where their technical understanding is translated into sensors, analytical methods, and other tools required for efficient production of high-technology materials and products.

For example, NML:

- Provides the emerging U.S. biotechnology industry with the measurement capabilities, engineering concepts, and processing methods needed for efficient, commercial-scale production.
- Developed a tool for "atomic mapping" of the magnetic characteristics of material surfaces. A boon to the $40 billion magnetic recording industry, the instrument will be produced commercially by a U.S. firm.
- Serves as the nation's reference laboratory for the 250 million chemical measurements made daily in the United States. NML, working with a U.S. firm, designed a new instrument for more efficient and more accurate separation and analysis of chemical elements in a sample.
- Is constructing a national free-electron laser user facility for research in physics, chemistry, biophysics, materials science, and medical sciences.

Information: A309 Chemistry Bldg., 301/975-3143.

National Computer Systems Laboratory

Computers are indispensable tools of the Information Age. Current uses, however, tap neither the full potential of rapidly improving hardware and software, nor the growing opportunities arising from new telecommunications technology that can simultaneously transmit data, image, and voice signals. NCSL is helping to ensure that the manufacturers and users of information technology will reap the anticipated benefits—better products, the growth of markets, and production applications of information technology. Beyond providing technical assistance, NCSL serves government and industry by developing standards, test methods, and computer-security measures.

Typically, NCSL:

- Helps the information technology industry and users develop cost-effective national and international standards for open systems that erase incompatibility barriers and allow exchange of information between the systems of different manufacturers.
- Develops standards and guidelines for protecting computerized information from threats of all kinds—operator error, power losses, natural disasters, and unauthorized users.
- Conducts research on parallel processing performance, speech recognition, and other rapidly evolving applications of information technology to provide a basis for standards development.

Information: B154 Technology Bldg., 301/975-2822.

National Engineering Laboratory

Scores of studies have emphasized the importance of manufacturing to the competitive position of U.S. industry. NEL researchers are making accelerated efforts to provide the measurements and technology U.S. firms need to compete in burgeoning markets for ever-faster semiconductors and optical communications equipment. In the Automated Manufacturing Research Facility, they work with industry to develop the supporting technology for future computer-integrated manufacturing systems.

Also on NEL's agenda are safety, public health, and the environment, as reflected in studies of fire prevention, evaluations of alternatives to ozone-depleting chlorofluorocarbons, and research supporting development of effective building regulations.

Specifically, NEL:

- Is developing, with a major electronics firm, a computerized "expert" system to help process engineers pinpoint probable causes of errors in semiconductor manufacturing.
- Devised, with an industrial partner, a greatly improved technique—100 million times better than previous methods—for making low-resistance electrical contacts to a class of high-temperature superconducting materials.
- Produces computer-based models and engineering tools that predict fire and its effects for use by fire protection and building communities in designing safer buildings.

Information: B119 Technology Bldg., 301/975-2300

Technology Services

For many U.S. businesses, the tools for building a competitive advantage already exist—in other firms, in university or federal laboratories, or even in off-the-shelf technology available from suppliers. NIST's industrial technology services, a still evolving array of outreach programs, aim to get the productivity-enhancing equipment and methods to the companies that need them.

Technology Services provides technical support, and in some cases financial assistance, to U.S. industry, especially small and medium-sized businesses, to facilitate the commercialization of products based on new scientific discoveries.

Among the services:

- Provides technical support and financial assistance to regional centers for transferring manufacturing technology to small and medium-sized firms.
- Develops Standard Reference Materials and Standard Reference Data and calibrates equipment and devices to aid in improving industrial quality control.
- Promotes technology innovation by technically evaluating innovations, inventions, and new technologies.
- Provides technical assistance to private, local, national, and international standards-writing organizations to ensure equity in the marketplace.

Information: A363 Physics Bldg., 301/975-4500.

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NIST

October 1989